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## THE ORIGIN AND VALUE OF WEATHER LORE.

DURING the past twenty years there have been published a score of collections of weather proverbs and sayings, most of which are out of print to-day. These have culminated in an exhaustive treatise on weather lore by the President of the Royal Meteorologic Society of England, in the form of a book containing three thousand proverbs. So far as I can determine, authors have vied with each other in grinding out the largest possible list of weather sayings, but no attempt has thus far been made to trace this lore to its origin, or to give it an approximate value. The importance of such a study may be easily seen when we reflect that of current weather lore at least half is entirely worthless and half the remainder of very doubtful service. For ten years I have been preparing material for a book on this general subject, and present herewith a preliminary study of the questions involved.

Weather folk-lore is based on the knowledge of the common people acquired through the ordinary observations of nature, animals, plants, etc., unaided by instruments. This knowledge was the first obtained by primeval man. Before the study of the stars must be placed that of the weather, and traces of such knowledge may be found, perhaps, in the names of the signs of the zodiac given at least two thousand years before our era. Aquarius (the Water Man), and Pisces (Fishes) are both considered meteorologic or watery signs.

In order to be of value, a weather saying should be based on a sufficient number of coincidences between the sign and the supposed resulting weather to make it represent a law. The general tendency of mankind is to give undue prominence to a single marked coincidence, and to ignore entirely the numerous instances where there are none; after a saying based on such hasty generalization is once started, it may be handed down to later generations, but its mere age can never add anything to its worth.

It is needful, in the first place, to mention a certain class of weather sayings or alleged rules for forecasting the weather which have no foundation in facts. It is easy to fancy that at the beginning of a new year the first twelve days ought to show the character of each of the following months. From such expectation arises the opinion, that as the weather is on January 1, so will it be through the month; as it is on January 2, so will it be through February, and so on. That is, if the temperature is low, or below the normal of that season, on any one of the twelve days, so the corresponding month will be cold; if any one of these days is stormy, so will be the month in

its order. Of somewhat the same character are sayings regarding the weather which is likely to follow that of special days ; for example, "If Candlemas day (February 2, instituted 542 A. D.) be fair and bright, winter will take a second flight ;" or, as current in this country, "On February 2, the ground hog (wood-chuck) comes out of his den, and if he sees his shadow, he goes back and stays six weeks, knowing that the winter will be thus prolonged." One would naturally conclude that a bright sunny day should be token of an early spring and not the opposite.

The same may be said of the saying relative to St. Swithin's day : "If it rains July 15, it will continue raining for forty days." The legend is that for some reason there was a delay in removing the body of the saint for a second sepulture, and as a result the rain continued forty days at the time. Such forecasts might be quoted by the hundred, and it is easy to see their worthlessness. One objection urged against the validity of such sayings, however, does not seem well founded ; namely, that since the reform in the calendar all these days come out of joint, so to speak, and are growing farther and farther away from their proper place as originally suggested. If the position of the day, as regards the annual swing of the earth about the sun, be the all-important consideration in determining the day of the supposed influence upon the weather, then by the reform in the calendar the day has been put back and rigidly fixed in its proper place in the annual march of the earth, and hence the proverb applies properly to the day, provided, of course, that its origin was during the early years of the Julian calendar.

Much of our pseudo weather lore may be traced directly to the astrologer and his vagaries. The moon changes almost before our eyes, hence the weather changes with the moon. Mars is a red planet and relatively near the sun, hence as fire is red and hot, Mars must be heating and drying and productive of fires. Saturn was to the astrologer the most distant of the planets from the sun, hence his influence was to produce cold (we speak of a Saturnine disposition). In like manner through the whole gamut of shooting stars, eclipses, comets, and so on. Shooting stars must be supposed to drive the wind before them, hence we should expect wind from the direction in which they are seen. The moon disappears from view three days before and after it is new, and these must be regarded as especially unlucky days and causing storms and wind.

An eclipse casts a shadow, or causes darkness over the earth, hence an eclipse portends storms and winds. Cardan has improved upon the ordinary astrologic view about eclipses, and has unwittingly introduced some truth in his interpretation of their influence, as follows : "Some eclipses of the luminaries at the time or even before

they happen raise showers and rain, others great droughts, some violent winds, others earthquakes, some a scarcity of fruits of the earth, others terrible fires." The curious thing is that Cardan and hundreds of other philosophers like him, while recognizing the diverse character of the conditions following each eclipse, utterly failed to see the proof that the eclipse itself can have absolutely no effect upon our weather, and, in like manner, that the position of a planet or star or any change in the moon can have no effect. It ought not to take much erudition to show that one eclipse cannot produce a severe drought and the very next one a heavy rain. Strange to say, in this evening of the nineteenth century, there are planetary weather prophets who believe and teach that Vulcan (there is no such planet) will make hot weather in a part of his orbit, but cold in another part.

It must be admitted that the universality of the belief that the moon affects our weather to a very marked degree is difficult of explanation. Has this belief been handed down from a common origin in the dim past, or have the different nations arrived at the same conclusion independently? It is quite difficult to learn just exactly what the common idea is. Out of perhaps fifty questions of as many persons in New England, it was gathered that most considered there to be a greater likelihood of rain at the time of new than of full moon, and observations along the North Atlantic coast seem to show a slight preponderance of rain near new moon. This, however, entirely fails in the interior of the United States, and on the Pacific coast the full moon seems to be the time of greater rainfall.

This belief in a lunar effect upon the weather has touched the world of science as well as of astrology. I find the following lunar table ascribed to the great Herschel, "constructed upon a philosophical consideration of the great attraction of the sun and moon in their several positions respecting the earth, and confirmed by the experience of many years' actual observation : " —

LUNAR TABLE.

If it be new or full  
moon or the moon  
enters into the  
first or last quar-  
ters at

	IN SUMMER.	IN WINTER.
Noon	Very rainy,	Snow and rain.
From 2 to 4 P. M.,	Changeable,	Fair and mild.
4 to 6,	Fair,	Fair.
6 to 8,	{ Fair, wind N. W.,	Fair and frosty, N. or N. E.
	{ Rain, wind S. W.,	Rain, S. or S. W.
8 to 10,	{ Fair, if wind N. W.,	Fair and frosty, if wind N. or N. E.
	{ Rain, if wind S. W.,	Rain, if S. or S. W.

10 to midnight,	Fair,	Fair and frosty.
0 to 2 A. M.,	Fair,	Hard frost, unless wind S. or S. W.
2 to 4,	Cold with showers,	Snow and stormy.
4 to 6,	Rain,	Snow and stormy.
6 to 8,	Wind and rain,	Stormy.
8 to 10,	Changeable,	Cold rain, wind W., snow, E.
10 to noon,	Frequent showers,	Cold with high wind.

I am aware that serious attempts have been made to prove that this table was not published till after Herschel's death. After a long hunt, however, I found the original publication in the "European Magazine" for July, 1811, and as Herschel did not die till eleven years after that date, the usual and only argument I have ever heard against his authorship falls to the ground.

It should be noted that the saying, "The moon at or just after its full has power to eat up clouds," has a curious scientific backing. It is probable that many have noticed a gradual breaking away of clouds near full moon, especially if the moon is seen through a thin veil of clouds. The full moon rises just as the sun sets, and at this time the heat of the sun is so moderated that its tendency to produce clouds is at a minimum; two or three hours later nocturnal cooling will begin another régime of clouds, but at this time most observers are asleep. We find from a long series of observations that the minimum of cloudiness in the twenty-four hours is from 8 P. M. to midnight.

Auguries professing to have an astronomical basis may be no more reasonable than those derived from natural objects. In a German scale published as early as 1507, if one would forecast the future, he is directed: If you would know the future, "cut a gall apple into two or three pieces; if you find therein flies, it betokens war the next year; if you find a little worm, the year will be fat and fruitful; if you find there a spider, so there will be deaths."

Equally untrustworthy are the forecasts of a coming winter, which are so frequently made from observations of planets, the behavior of animals, and so on. In the winter of 1893-94 there were made special notes of such predictions which were directly opposite each other. In New York, Chenango County, was published the statement that the thick husks of corn of a deep orange tint; the goose bone being larger and whiter than usual; the crops of nuts immense in quantity and squirrels laying in great stores of them; the partridges and woodcocks fearlessly approaching farmyards; and ducks flying in U shaped instead of V shaped flocks toward the south, — all indicated an unusually early and severe winter. Two weeks later a farmer in Pennsylvania predicted a mild winter from the fact that toads were hopping about in November; meadow moles were

rooting up little mounds; the fur of coons and skunks was thinner by half than usual. The same view was published in Virginia based on the fact that there were very few persimmons, and that hornets' nests had been built in the tops of the trees. It is plain that the condition of the plant and animal gives absolutely no indication of the coming season, but is due rather to good nourishment or lack of it.

There are also found the following in England and Germany as early as the sixteenth century: "If Christmas day be on Sunday, that year shall have a warm winter. If on Monday, there shall be a mild winter. If on Tuesday, it shall be a cold winter and moist," and so on through all the days of the week. There is often a good deal of rhyme about such sayings, but there is absolutely no reason in them.

If there was a single spring or source from which the stream of weather lore had started, and if into this stream other smaller rivulets have flowed from time to time, on following back the main stream we would naturally expect to find it gradually narrowing to its source. This, however, is not the case, and it is not difficult to see that if there is any relation between the appearance of clouds, the behavior of animals and plants, and the ensuing weather, such relationship could be discovered independently by observers in all parts of the world and all along the passing centuries. The origin of a good deal of our weather lore is dependent upon the climate of the country in which it began, and in many cases the weather of the country will be a valuable criterion by which to trace such sayings. For example, all the weather sayings regarding rain or the rainy season in Greece or Palestine must harmonize with the fact that all the precipitation in those countries falls between November and March.

There is a kind of weather lore that has been greatly misinterpreted, in many cases, from a failure to recognize its origin. Before the establishment of the calendar and the setting in order of the months and seasons of the solar year, it was very necessary to determine the approach of each season in order to facilitate farming operations. At the first this could be done only by watching the rising and setting of the constellations. Thus Hesiod says that when the Pleiades rise, the harvest begins. Such sayings have been interpreted as indicating an actual benefic or malevolent influence from stars, but seem, in the first instance, to have depended simply on the necessities of the observer. So the piece of weather lore contained in Job, referring to the sweet influences of the Pleiades, depends on nothing more than the indication of the coming season as shown by the appearance of these stars.

Hesiod, in his "Works and Days," tries to encourage the laggard farmer by saying, "But if you shall have ploughed late, this would be your remedy: When the cuckoo sings first on the oak foliage, and delights mortals over the boundless earth, then let Zeus rain three days and not cease, neither over-topping your ox's hoof nor falling short of it; then would a late plougher be equal with an early one." There would seem to be a grim humor in this advice, for such a rain would help the forward farmer even more than the laggard. The reference to the cuckoo is interesting, inasmuch as it has come down through the centuries as the best-known animal sign of rain. We have the cuckoo pluvialis, and, in our own country, it is called the "rain crow." It has a mournful, monotonous cry once heard never to be forgotten. It is a rare bird, though noticed by myself in New England, and again after reaching Washington. Hesiod also points out that the first call of the crow as it migrates northward is an indication that spring is nigh.

The earliest large collection of weather signs we owe to Theophrastus, belonging to the fourth century B. C. He says, after speaking of signs derived from domestic and other animals, "but for the most part signs derived from the sun and moon are the most important." In this he refers, in part at least, to the waxing and waning moon, but mostly as to the appearance of the sun and moon, when clouds are hovering near. He says: "The ends and beginnings of lunar months are apt to be stormy, because light fails from the fourth day before to the fourth day after new moon. The obscuration of the moon occurs in a similar way to an eclipse of the sun." He gives the call of the tree toad as a precursor of rain, and this has come down to us as another valuable prognostic. He also says: "An ass shaking its ears is a sign of storm." A modern version of this sign is given as follows: An English philosopher, while driving out with a friend, stopped to ask a shepherd boy the way. As he was about to drive on, the boy warned him that it was going to rain, but the philosopher, not seeing a cloud in the sky, drove on. Sure enough, in an hour and a half the rain came in torrents. The next day the philosopher determined on learning the boy's secret. On seeing him, the boy refused to divulge, but on clutching the proffered guinea in his hand he said, "Do you see that old black wether over there? Well, when he stands facing the wind, shakes his head, stamps his foot, and snuffs up the wind, it is a sure sign that it will rain in an hour or two." Of course, if we are to give credence to such a sign, there should be more than one sheep in a large flock having the same or like impulses.

There are many who believe that animals have a finer sense in distinguishing coming weather changes than man can have, even

with the aid of the finest instruments ; for example, a hunting dog has a wonderfully developed sense of smell ; the insects with their extremely delicate organisms would be susceptible to the slightest variations in weather ; plants with their chlorophyl and living principle may change very readily with weather changes, and so on. Not long ago a statement was published in the " American Meteorologic Journal " that certain snails in Georgia changed color on the approach of rain. A letter was immediately dispatched, making fuller inquiries, but no response was ever received. It cannot be shown that a storm ever makes its presence felt by changes in moisture, pressure, or temperature which animals will notice before our more delicate instruments. In the case of moisture it is quite certain that the change comes simultaneously *with* the storm and not before it. The evidence seems strong that there may be an influence emanating from a storm other than that which can be ascribed to moisture, pressure, temperature, or any other commonly recognized condition. Nor do we need to go to animals to discover such an influence. Many persons who have lost limbs, or are subject to rheumatic pains, recognize such a condition. Captain Catlin, who has made a most interesting and scientific study of this whole question, has decided that there are certain thunderstorms and electric conditions which alone are responsible for the pains in nerves. Probably many have known persons who are extremely uneasy and nervous on the approach of a thunderstorm, but who are instantly relieved on the first clap of thunder.

Many readers will have noted in the summer twilight the sharp hum of the nighthawk as he strikes the air with his wing in darting for prey, also swallows as they skim just above the ground. These are both signs of coming storms ; the insects are driven down by the condition of the atmosphere, and the birds are forced to follow them.

Many ancient weather signs, more valuable than any derived from animals, are based on the appearance of clouds and fogs at sunrise and sunset, and other optical phenomena. One of the best of these is quoted in the New Testament, Matt. xvi. 3 : " When it is evening, ye say, fair weather : for the heaven is red. And in the morning, foul weather to-day : for the heaven is red and lowring."

The same idea is popularly expressed in the rhyme : —

Evening red and morning gray  
Will speed a traveller on his way ;  
But evening gray and morning red  
Will pour down rain upon his head.

In this case, if the red seen at evening extends round the horizon, it is not a good sign of fair weather on the next day.



The rhyme which affirms that

A rainbow in the morning  
Will give a sailor warning,  
A rainbow at night  
Is the sailor's delight,

has something of a scientific basis. The morning light reflected and refracted from drops to the westward causes the rainbow. In the afternoon the drops have passed by toward the east, and hence a rainbow in the east shows that the storm has passed, as all our storms in the temperate regions travel from west to east.

Aratus says : " If there be a single red circle about the moon, it betokens a storm ; if two circles, a severe storm ; and if three, a very severe storm." In a part of this statement, he undoubtedly has reference to a corona, which is very near the sun or moon, and shows prismatic colors, but he must also intend to include the halo of twenty-two degrees radius. The popular saying is that the number of stars within the ring around the moon shows the number of days before the storm. The halo, being due to the presence of crystals or much vapor, is a fair precursor of a storm, but the addition relating to the number of stars is fanciful, as the storm will come within thirty-six hours if at all.

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EDITOR'S NOTE. — Henry Allen Hazen, the author of the preceding paper, died in Washington, D. C., January 22, 1900, at the age of fifty-one years. He was born in Sirim, India, being a son of Rev. Allen Hazen. In 1881 he entered the Signal Service at Washington, and in July, 1891, was attached to the Forecast Division of the Meteorological Bureau. He was the author of a great number of publications, scattered through periodicals, a complete list of which would extend to several hundred titles. Mr. Hazen, who was greatly interested in the study of weather signs and traditional weather lore, had made collections looking to a classification of these ; but although his preparations had made such progress that he had undertaken to seek a proper medium for the publication of his material, his death left the work in a state too incomplete to permit the use of his notes. The paper here printed was given in the form of an address before a scientific society.